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MATERIAL SAFETY DATA SHEET

TRADE NAME (Common Name or Synonym): **Nickel Based Alloy Steel**

CHEMICAL NAME: **Alloys 200, 400, 600, 800 series**

I. INGREDIENTS

NOTE: PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD

Ingredients	CAS Number	TLV (2)	Ingredients	CAS Number	TLV (2)
Aluminum (Al)	7429-90-5	10	Nickel (Ni)	7440-02-0	1
Chromium (Cr)	7440-47-3	.5	Niobium (Nb)	7440-03-1	None Established
Cobalt (Co)	7440-48-4	.1 (Dust & Fume)	Silicon (Si)	7440-21-3	10 (Total Dust)
Copper (Cu)	7440-50-8	1 (Dust & Fume)	Tantalum (Ta)	7440-25-7	5
Iron (Fe)	7439-89-6	10 (As Iron-Oxide)	Titanium (Ti)	7440-32-6	10 (Total Dust)
Manganese (Mn)	7439-96-5	5 (As Dust-Ceiling)	Tungsten (W)	7440-33-7	5
Molybdenum (mo)	7439-98-7	10 (Insoluble Comp.)	Yittrium (Y)	7440-65-5	1

% Alloying Elements (1)

UNS Numbers	Al	Cr	Co	Cu	Fe	Mn	Mo	Ni	Nb	Si	Ta	Ti	W	Y
N02200 series (Commercially Pure Ni Alloy)		<2				<5		95-99				<5	<5	
N04400 - N05500 Series (Ni-Cu Alloy)	<5	<1		27-68	<1	<5		31-67		<1	<2			
N06600 - N07700 Series (Ni-Cr Alloy)	<5	15-48	0-13		1-40	<5	2-10	39-80	<5		<2	<3	<5	<1
N08800 - N09900 Series (Ni-Fe-Cr Alloy)	<5	.1-30	0-15	<2	30-84	<1	<5	.1-42	<5			<3		<1

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985-1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

MATERIAL IS (At Normal Conditions)	APPEARANCE AND ODOR	% VOLATILE BY VOLUME	VAPOR DENSITY
☐ LIQUID ■ SOLID ☐ GAS ☐ OTHER	Grey-Black, Odorless	N/A	N/A

ACIDITY/ALKALINITY			
pH = N/A	Melting Point Approx. 2300 °F Boiling Point N/A °F	Specific Gravity (H_20) = 1) Approx. 7 Solubility in water (% by weight) N/A	VAPOR PRESSURE (mm Hg at 20°C) N/A

III. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.	HANDS, ARMS AND BODY Protective gloves should be worn as required for welding, burning or handling operations.
EYES AND FACE Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting.	OTHER CLOTHING AND EQUIPMENT As required depending on operations and safety codes.

IV. EMERGENCY MEDICAL PROCEDURES

INHALATION:	Remove to fresh air; if condition continues, consult a physician.
EYE CONTACT:	Flush thoroughly with running water to remove particulate; obtain medical attention.
SKIN CONTACT:	Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.
INGESTION:	If significant amounts of metal are ingested, consult physician.

V. HEALTH/SAFETY INFORMATION

Health

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes or iron, manganese and copper may cause metal fume fever characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron-oxide fumes or dust may lead to a benign pneumocomiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chromium and nickel and their compounds are listed in the 3rd Annual Report on carcinogens, as prepared by the National Toxicology Program (NTP). Exposure to high concentrations of dust and fumes can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract and possibly cancer of the nasal passages and lungs.

Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Fire and Explosion

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR	EXTINGUISHING MEDIA
N/A °F	N/A	Lower N/A % Upper N/A %	N/A

FIRE AND EXPLOSION HAZARDS	EXTINGUISHING MEDIA NOT TO BE USED
Steel products in the solid state present no fire or explosion hazard.	Do not use water on molten metal.

Reactivity

STABILITY	INCOMPATIBILITY (MATERIALS TO AVOID)
■ Stable ☐ Unstable	Reacts with strong acids to form hydrogen gas.

CONDITIONS TO AVOID: N/A

HAZARDOUS DECOMPOSITION PRODUCTS:

Metallic dust or fumes may be produced during welding, burning, grinding and possibly machining. Refer to ANSI Z49.1

VI. ENVIRONMENTAL

SPILL OR LEAK PROCEDURES

Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for reuse.

WASTE DISPOSAL METHOD*

Used or unused product should be disposed of in accordance with Federal, State or Local Laws and Regulations.

*Disposer must comply with Federal, State and Local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.

Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.

DISCLAIMER

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